Lake Ontario Lower Aquatic Foodweb Assessment: Understanding Changes in a Post-Zebra Mussel Foodweb

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The introduction of exotic mussels and zooplankton to Lake Ontario during the 1990s dramatically altered the flow of nutrients through the lower aquatic foodweb threatening the survival of native species and undermining efforts to restore naturally sustaining populations of native fish. Declines have been seen in algal photosynthesis and epilimnetic zooplankton production. Lake Ontario's keystone benthic species, the amphipod Diporeia, once numbering thousands of individuals per square meter, disappeared from many nearshore waters following the arrival of zebra and quagga mussels (*Dreissena spp.*). Lake Ontario fish are now showing signs of stress as important prey items such as Diporeia have declined.

In 2003, U.S. and Canadian Lake Ontario fishery and water quality managers pooled their resources to conduct the Lake Ontario Lower Aquatic Foodweb Assessment (LOLA) in order to characterize the current state of the foodweb. Water quality, benthos, and zooplankton samples were collected from 28 stations across the lake during spring, summer and fall. U.S. and Canadian research vessels collected the samples using the same method and analytical protocols. The sampling approach was designed so that a pre-zebra mussel lower foodweb assessment conducted in the 1980s can provide a historical point of comparison. Optical plankton counters were tested as a potential tool to monitor zooplankton populations on a lakewide scale.

Project partners include Environment Canada, Ontario Ministry of the Environment, New York State Department of Environmental Conservation, Canada Department of Fisheries and Oceans, NOAA, U.S. EPA ORD Duluth, Cornell University, University of Toronto, and U.S. EPA Region 2. The data will be interpreted in 2004 through the assistance of an EPA ORD RARE grant.

This assessment will determine the degree to which native zooplankton and benthic communities have been disrupted by exotic species over the last decade. It will also provide an indication of the current "carrying capacity" of the lake to support fish populations. LOLA is the first step in the development of a long-term coordinated binational approach to monitor the state of Lake Ontario.